

Vehicle Use Case Task Force
L3: Customer connects PEV to Another Home, Outside Customer's Home Territory

Document History

Revision History

Revision Number	Revision Date	Revision/ Reviewed By	Summary of Changes	Changes marked

Approvals

This document requires the following approvals.

Name	Title

Vehicle Use Case Task Force

L3: Customer connects PEV to Another Home, Outside Customer's Home Territory

1.1 Use Case Title

L3 – Vehicle Use Case

Customer connects PEV at Another Home (premise) and outside the customer's home territory.

1.2 Use Case Summary

This use case details the Connection Location (VIN Authentication, Basic Charging per enrolled program) for the customer to transfer energy. This is precluded by specific enrollment process by one or more of the connection architectures as described in Use Cases S1-3. This sequence of Use cases is followed by Use cases PR1 series that summarize the previous Use Cases.

1.3 Use Case Detailed Narrative

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3. Step by Step Analysis of Each Scenario

Use Case L3: Custom Customer connects PEV at Another Home (premise).

3.1 Scenario Description

Primary Scenario (L3): Customer connects PEV to energy portal at another premise outside the enrolled Utility's service territory.

This scenario describes what happens if customer plugs PEV into another premise (not his own, and not serviced by the same utility (i.e. roaming utility), where the PEV operator is responsible for the cost of energy delivered to the PEV charged at the premise.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>The customer plugs in the PEV using either EVSE cordset or Premise EVSE for charging</i>	<i>PEV</i>	<i>Customer has enrolled PEV with home utility. Enrollment and Initial Setup steps Both home and foreign/roaming utility participate in inter-utility clearinghouse.</i>	<i>The foreign/roaming utility and the clearinghouse have record of the energy purchased transactions related to the customer premise, the PEV ID, the Customer ID, and the Utility ID.</i>

3.1.1 Steps for this scenario

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
1	PEV	PEV connects PEV at a location outside of the home Utility service territory. PEV owner will pay for charging. Customer can plug in his PEV using either EVSE cordset or Premise EVSE for charging	PEV may display message communicating charging/billing options or information to the Customer.
1a	Customer	Customer connects EVSE cordset to Energy Portal at Premise.	Startup steps are provided in S1
1b	EVSE	Customer connects Premise Mounted EVSE to PEV.	Startup steps are provided in S2

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
2	PEV	PEV prepares for charging rate (charger size or ALC, whatever is lowest). PEV senses power to on-board charging unit and activates 'On Plug' state.	
3	PEV/ Energy Services Communications Interface (ESCI)	PEV and Energy Services Communications Interface (ESCI) perform PEV binding and authentication process	Implementation could have PEV or ESCI as initiator of session.
4	PEV	PEV ID is transmitted to ESCI.	Unique PEV ID will ultimately support portability of charging, among other purposes.
5	ESCI	ESCI maintains communication session and security between PEV and Roaming Utility. ESCI transmits request for validating PEV ID to Roaming Utility, including Premise ID.	
6	Roaming Utility	Roaming Utility checks PEV ID and Premise ID against internal database. When not found (because PEV is registered with home utility), Roaming utility forwards PEV ID and Roaming Utility ID to Clearinghouse for verification.	
7	Clearinghouse	Clearinghouse checks PEV database for PEV ID and finds corresponding Home Utility ID, and Home Utility Account/Premise ID.	Underlying assumption is that PEV has been registered with home utility and that both utilities participate in the clearinghouse.
8	Clearinghouse	Clearinghouse transmits confirmed message to Roaming Utility, including PEV ID, Home Utility ID, and Home Utility Account/Premise ID.	
9	Roaming Utility	Roaming Utility transmits confirmed message via ESCI to End Use Measurement Device (EUMD) indicating successful binding with premise ESCI.	
10	ESCI	ESCI transmits confirmation message to PEV indicating successful communication session binding of PEV to Roaming Utility at PEV program tariff. PEV is able to provide indicator to customer that binding has been successful (and that he will receive incentive rate upon charging, if applicable).	

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
11	PEV	PEV sends Energy Request (amount and rate) and Schedule (according to enrolled PEV program)	
12	Utility	Utility compares request with available and confirms or adjusts for message back to PEV Utility sends Energy Available (amount and rate) and Schedule (according to enrolled PEV program)	
13	PEV	PEV prepares for charging	
14	PEV	PEV begins charging based on Customer selected preferences. Charging may be delayed based upon Customer preferences or grid reliability criteria (e.g., off-peak economy charging, demand response event underway, short, randomized charging delay to promote grid stability, etc.)	The vehicle needs to record the energy delivered as a running total for the event. This would be a reference to be compared with the EUMD total. The EUMD has logged the actual energy flow accumulation for the utility
15	End Use Measurement Device	EUMD records charging information and energy supplied to PEV for each charging session. Charging information includes PEV ID, Premise ID, energy usage, and time stamp for each metering interval.	
16	End Use Measurement Device	EUMD communicates to Energy Services Communication Interface energy supplied to PEV ID for each charging session.	This communication could be on a periodic basis during charging, upon vehicle unplug from energy portal, or a combination of the two.

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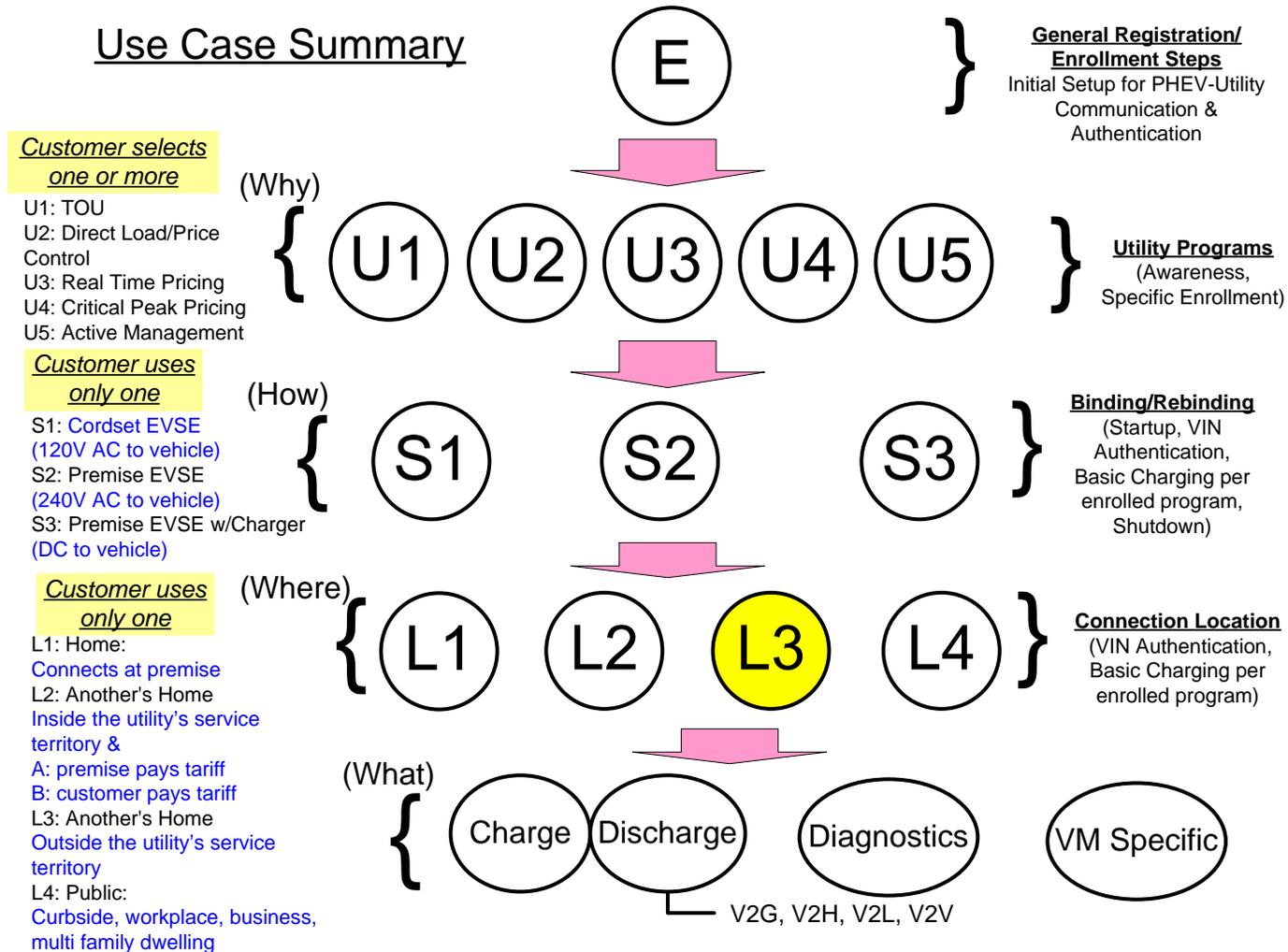
<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
17	Energy Services Communication Interface	Energy Services Communications Interface (ESCI) communicates to Roaming Utility energy supplied to PEV for each charging session.	This is the status of the cycle for the Utility, PEV and Customer information. J2836 identifies the periodicity of these messages. It may be desired to have this summed on a regular interval (every minute) in case the charge cycle is interrupted prior to the end so the current information (running summation) is not lost
18	Roaming Utility	Roaming Utility records each PEV charging session for reporting to Clearinghouse. Customer account associated with this roaming utility premise will be credited for energy supplied for this charging session.	
19	Roaming Utility	Roaming Utility forwards transaction to Clearinghouse for energy supplied to PEV including PEV ID, Customer ID, Home Utility ID, and interval based charging session information.	
20	Clearinghouse	Clearinghouse receives energy charge transaction from Roaming Utility for posting charges to PEV operator's home utility Customer account.	

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4. Requirements

This use case is the 4th in a series that follows Use Cases S1-3 for connection architectures. This use case defines the steps for the customer connecting at another home outside the customer's territory.



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4.1 Functional Requirements

Func. Req. ID	Functional Requirement	Associated Scenario # (if applicable)	Associated Step # (if applicable)

4.2 Non-Functional Requirements

Non-func. Req. ID	Non-Functional Requirement	Associated Scenario # (if applicable)	Associated Step # (if applicable)

4.3 Business Requirements

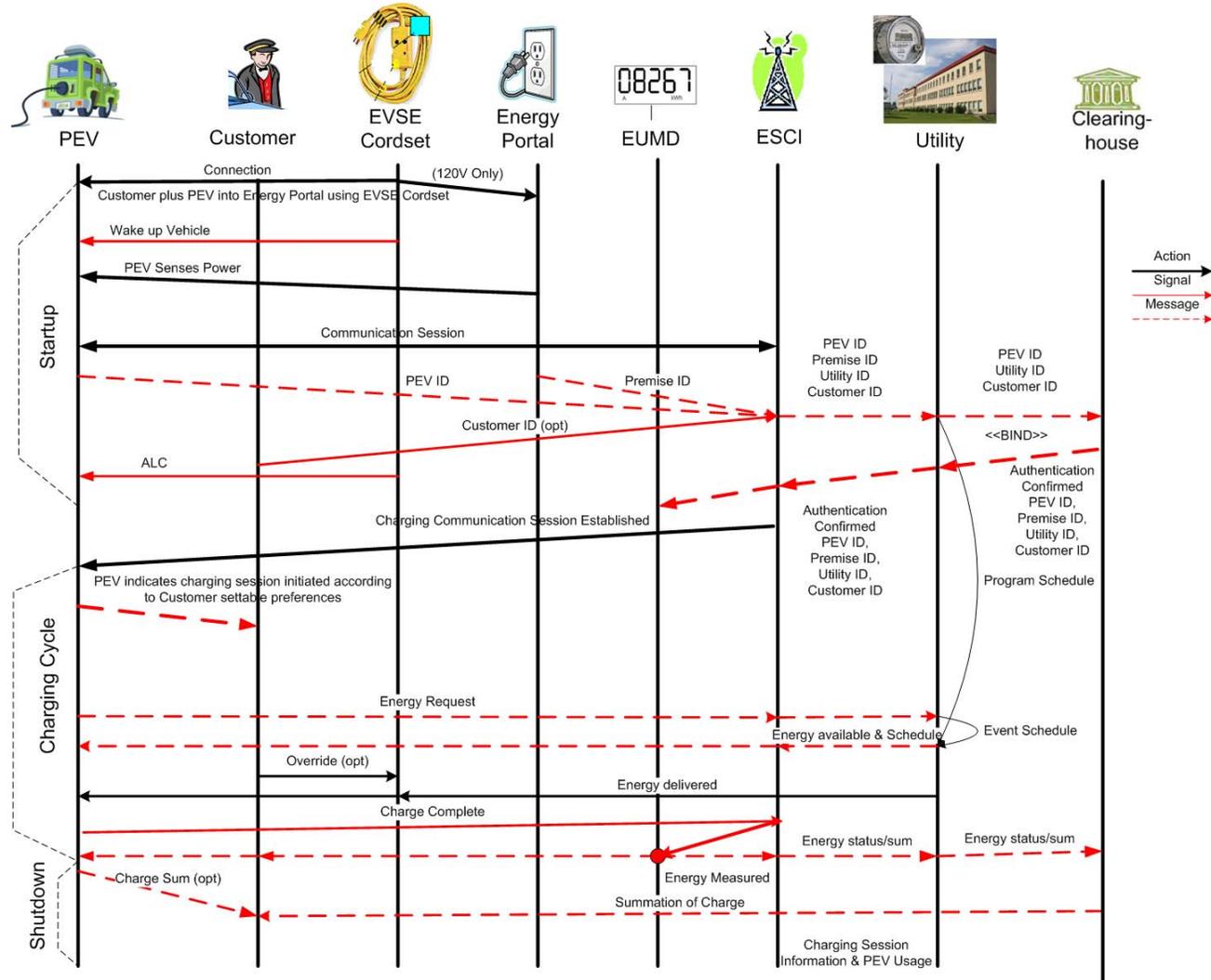
Bus. Req. ID	Business Requirement	Associated Scenario # (if applicable)	Associated Step # (if applicable)

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5. Use Case Models

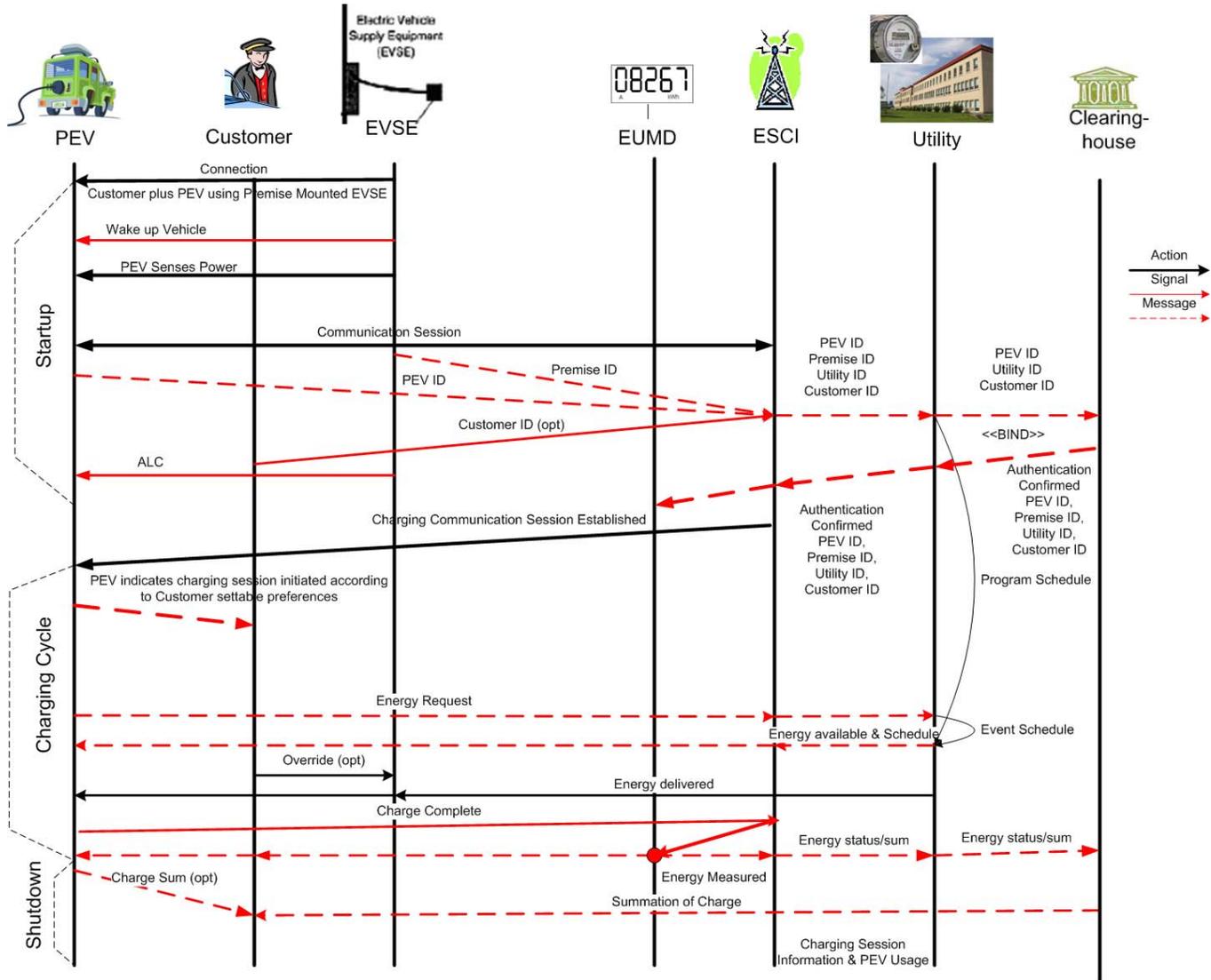
5.1 Sequence Diagram using EVSE Cordset



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5.2 Sequence diagram using premise EVSE



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5.3